Intergenerational Transmission of Education: Gender and Ethnicity in Guatemala

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Background:

There is vast evidence that income and education are transmitted from generation to generation. These intergenerational correlations have implications for the degree of equality of opportunity in a particular society and make its members more or less mobile. Schooling in particular is a mechanism of intergenerational mobility because it increases the probability of an individual’s children to be educated, and thus increases their future expected income. Intergenerational correlation in schooling attainment is problematic because, as pointed out by Ashenfelter and Rouse, a high correlation between father’s and son’s education not only would signal lack of social mobility, but would also overestimate the causal effect of schooling on income, by not taking into account the effect of educated parents connections and lower information costs associated with network effects. Income inequality and lack of opportunity would be reinforced through the direct mechanism of transmission of human capital and through social capital networks. Not much is known about the process of intergenerational transmission of educational attainment in the developing world, mainly due to the lack of longitudinal datasets. There is however reason to believe that the high degree of inequality as well as stratification prevalent in developing countries may contribute to greater persistence in the intergenerational transmission of opportunities. If schooling is strongly affected by family background, then intergenerational correlation in education across families will be high and social mobility will be low. This paper describes the intergenerational transmission of educational attainment in Guatemala through the degree of regression to the mean of the schooling of children compared to the schooling of their parents, interpreted as a measure of equality of opportunity in Guatemalan society. It also explores the effect of high inequality in the distribution of assets between the white and indigenous ethnic groups on social mobility; and extends the analysis to investigate whether there is heterogeneity in the degree of persistence across the conditional education distribution.

Descriptive Statistics and Econometric Analysis:

The measurement of social mobility in the context of a less developed country depends on the available data. Most of the data for the region—with the exception of Brazil—consist of cross-sectional, not panel data.
data sets. Faced with such limitations, Behrman (2001) suggests the estimation of relations from cross-
sectional datasets that contain recall data. If information for the educational attainment of two
consecutive generations is available, the econometric model used to investigate the degree of
intergenerational mobility in education—and the transmission of schooling from parents to children—is
then given by:

\[ S_n = \alpha + \beta S_{pi} + \varepsilon_i \]  (1)

where \( S_n \) represents the educational attainment of the respondent to the survey in family \( i \), \( S_{pi} \)
represents the education of the father or the mother of the respondent, and \( \varepsilon_i \) is a stochastic term with
\( E(\varepsilon_i) = 0 \), \( E(\varepsilon_i S_{pi}) = 0 \) and \( E(\varepsilon_i^2) = \sigma_{\varepsilon}^2 \). The coefficient \( \beta \) obtained through OLS regression measures
the intergenerational persistence of educational attainment. The expression \( 1 - \beta \) is called the degree of
regression to the mean, or degree of intergenerational mobility in education. The higher the value of \( \beta \),
the more likely it is that the children of very educated parents acquire education, and that the children of
poorly educated ones remain uneducated. A value of \( \beta \) close to one suggests a very limited degree of
intergenerational mobility, whereas a low a value of \( \beta \) is a sign that educational attainment is not strongly
correlated across generations. Several unobserved factors are incorporated into the value of \( \beta \), such as
individual ability, cultural background, family wealth, spatial segregation related to education quality,
and public provision of education. For this reason, no causal relationship between parental and child
education should be inferred from this analysis, and \( \beta \) will be interpreted as a measure inequality of
opportunity, a mechanism of transmission of the effect of family characteristics—particularly ethnicity—on
socio-economic outcomes.

The ENCOVI 2000 dataset was used in this paper to obtain information on education (years) of each
surveyed individual and the educational attainment of her parents, parental education and other variables.
The final sample contains 15,662 cases for which complete information on individual and parental
education is available. Respondents were divided into four cohorts corresponding to individuals born
from 1900 to 1978. The sample was evenly divided into individuals born in rural and in urban areas; and
balanced in terms of ethnicity and gender. The average schooling is 4.7 years. A pattern of inequality in the
distribution of human capital can be found when analyzing the education of the parents of individuals on
the sample. Fathers are more educated than mothers, and both have very few years of education. Mothers
in particular are deprived of schooling. The means of the distributions of father’s and mother’s schooling
are 2.3 and 1.6 years respectively. The median of years of education is zero for both; therefore at least half
of all mothers and fathers had no schooling. Whites have more educated parents than indigenous people,
with the difference being around an additional 2 years of schooling on average for fathers and mothers
educational attainment.

The descriptive statistics confirm that more educated parents will be observed to have more educated sons
and daughters. There is an additional ethnicity dimension in the process of transmission educational
attainment: indigenous people start the process of acquiring human capital from a disadvantage position
since on average, indigenous mothers and fathers are less educated than their white counterparts. Figure 7
-representing the cumulative distribution of years of education for the whole sample conditional on the
education of the father-, shows that persistence is higher for children of parents with little or no schooling
and less important for children of parents that have completed primary schooling. The implications of
persistence at the bottom of the education distribution are highlighted by the fact that the median of parental education is zero years.

RESULTS

OLS results for the whole sample show the child of a father one year of schooling below the mean of the distribution will be 0.6 years below the mean too. The estimate of the coefficient of persistence for the education of the mother was higher, at 0.69, initially suggesting a greater impact of maternal education on the persistence of educational attainment of the respondent. These estimates are consistent with those obtained by Behrman et al (2001) for other Latin American countries - 0.7 Brazil and Colombia, 0.5 for Mexico and Peru, as well as with the figure of 0.68 for Brazil obtained by Veloso and Guimaes (2003). By using only the schooling of the most educated parent as an explanatory variable, previous studies fail to take into account the combined effect of the education of both father and mother. The $\beta$ coefficient would pick up the effect of the education of the other parent and overestimate the degree of persistence, by ignoring the mechanism of transmission of inequality resulting from assortative matching. When both variables were included in the regression, similar coefficients of 0.38 and 0.42 were obtained for father's and mother's education, indicating that the effects of father's and mother's education reinforce each other and seem to be of the comparable magnitude. The coefficients are statistically different from each other, suggesting that mothers schooling is more important than father's in terms of persistence. Separate regressions were also run by cohort of birth. Persistence is decreasing, but the average difference in the levels of educational attainment for subgroups of the sample remains. Younger cohorts have lower levels of persistence for parental education. Although mother's education seems to have a bigger effect than father's education on the schooling of the next generation for younger cohorts, the difference decreases over time, converging around 0.35. Although the mean of the distribution of schooling increases steadily over time, the overall degree of regression to the mean is not that different between cohorts.

In order to explore specific channels that affect the degree of persistence in educational attainment, interaction terms for ethnicity, assortative matching and gender are added to the OLS model. As opposed to running the regression for whites and indigenous separately, the ethnicity interaction coefficient will estimate the difference in persistence between a white person and an indigenous person, in relation to the mean of the distribution of education of the entire sample, thus testing equality of opportunity in the society as a whole. Consistent with our previous finding that indigenous people have higher levels of persistence in educational attainment, we find the interaction term to be significant and positive. On average, being indigenous increases the degree of persistence from 0.36 to 0.46 years from the mean, a 28% increase in the value of the coefficient.

By including an interaction term for assortative matching, we can see how the persistence coefficient changes as the distance between spouses’ education grows. We find that, on average, distance between partner's education has a positive effect on the degree of persistence. Finally, when non-linearity in the intergenerational correlation in schooling is taken into account by introducing a squared and cubed term for Father's education, we find both terms significant. The cubed terms shows higher levels of persistence at the bottom and at the top of the distribution of schooling. As a result of the change in functional form, the ethnicity interaction term falls in magnitude and stops being statistically significant, implying that the stickiness of education attainment is higher among indigenous people due to the fact that they are mostly found at the bottom of the education distribution (as well as in the unobserved income distribution). There seems to be evidence of a poverty trap, with ethnicity being a proxy for exclusion and lack of opportunity associated with credit constraints. Given that the previous results arise from the sample as a
whole, it is possible that direction of the effect of some variables is different according to ethnicity. Running the specification separately for each ethnic group shows that the $\beta$ for indigenous people is twice as high (0.58) than that of whites (0.33).

Finally, a quintile regression approach is used to examine the non-linearity of the relationship between ethnicity and persistence in schooling, allowing for different degrees of persistence along the complete conditional educational distribution; where all individuals are converging to the same sample mean. The results show differences in the degree of persistence in educational attainment according to ethnicity along the conditional education distribution. The coefficient of persistence for Father’s education is positive and significant along the entire distribution, with increased “stickiness” at the bottom (quantiles 1 and 2) and at the top of the distribution. The coefficient of persistence corresponding to Mother’s education is also positive and significant for all quantiles. Mother’s education is more persistent than Father’s education for the second half of the conditional distribution of schooling, starting at quantile 6. Indigenous people are less mobile than whites, but the magnitude of the effect of ethnicity on persistence depends on the quintile of the conditional distribution of schooling. The interaction coefficient is negative and significant for the first two deciles of the distribution; positive but not significant in deciles q3 and q4; and positive and significant for the upper half of the distribution, including q5. Figure 1 plots the values of the persistence coefficient and the ethnicity interaction. The red line the line in the graph depicts persistence for whites and the blue line the persistence for non-whites. At the bottom, being indigenous actually increases mobility by a magnitude of 50% of the persistence coefficient in q1 and by 20% in q2. For the rest of the quintiles starting at q5, being indigenous decreases educational mobility, and the effect is stronger along the distribution.

CONCLUSIONS

This paper extends the study of the process of intergenerational transmission of educational attainment in the developing world, to include ethnicity as a factor associated with this process. Using several specifications, the results show that educational achievement exhibits higher persistence from generation to generation among indigenous people. The effect of father’s education on persistence seems to be more important for males. For females, the education of the mother may contribute positively to educational mobility. The finding is in line with other studies in developing countries that suggest that mother’s with more schooling influence intra-household allocation of resources. Cohort analysis shows that social mobility is improving in Guatemala, but at a very slow rate. Younger cohorts have lower levels of persistence for parental education, but the overall degree of regression to the mean is not that different between cohorts. The conditional distribution of educational opportunities seems to have remained approximately constant over time with respect to educational family background. This finding would contradict the idea of a a substantial “opening up” of opportunities, -and a decrease in the correlation between father’s and child’s human capital-, in Guatemala in the XXth century. Results also show the distance in educational attainment between partners as negatively correlated with the degree of persistence for indigenous people only. Differences in educational attainment between parents are positively correlated with persistence in a similar magnitude for whites. Women seem to be more mobile than men, an effect perhaps arising from a “catching up” resulting from a trend of improvement of the average level of schooling. Results from quantile count regression clearly show systematic differences in the degree of persistence in educational attainment according to ethnicity with indigenous people being less mobile than whites. Overall, the analysis shows that people do not tend to regress to the mean of the population in

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5 Koenker and Basset (1982).
terms of their educational attainment -a sign of relative equality of opportunity-, but it rather seems that an individual’s education and chances in life are strongly correlated with those of his parents.

SELECTED REFERENCES:


FIGURE 1

![Persistence of Father's Education](image-url)